

SFA Modernization Program

**United States Department of Education
Student Financial Assistance**



Campus Based System Solutions Tools Selection Document

***Task Order #49
Deliverable #49.1.2***

Table Of Contents

1	Introduction	3
1.1	Purpose.....	3
1.2	Scope	3
1.3	Organization of this Document.....	3
2	Requirements.....	4
2.1	Requirements Overview.....	4
2.2	Business Requirements List.....	4
3	Proposal.....	5
3.1	Campus Based Hardware Overview.....	5
3.2	System Load Requirements.....	5
3.3	Hardware Requirements List	6
3.4	Software Requirements List.....	7
3.5	Use of Existing VDC Hardware.....	8
3.6	Software Versioning Issues	9
4	Configuration Management Tools	10
5	Environment Timing.....	11

1 Introduction

1.1 Purpose

The purpose of this document is to identify the solution software and hardware requirements that will be used in the redesign of the Campus-Based System (CB System). The design of this recommended architecture is intended to minimize user response time, increase system availability and scalability while minimizing the cost to Student Financial Assistance (SFA). This recommendation was created under the guidelines of the SFA Standard Architecture Policy.

1.2 Scope

This document defines at a detailed level the hardware platform, development environment, and production environment that will be utilized for the creation of the redesigned CB System. The requirements for this initiative were gathered via the Campus-Based (CB) Mad Puppy, interviews, focus groups, SFA Standard Architecture Guidelines, and walkthroughs with CB staff to ensure that the redesigned system would support SFA's modernization goals.

1.3 Organization of this Document

A brief explanation of the topics addressed in this document are as follows:

- **Introduction:** An explanation of the purpose of this document and it's arrangement.
- **Requirements:** A list of the requirements that were used in determining the size, solution platform, solution tools and design of the CB System.
- **Proposal:** A description of the necessary technical tools, the ability of the current VDC architecture to support the CB System redesign, and identification of any software issues related to use of the current VDC architecture.
- **Configuration Management Tools:** Identification of configuration management tools that will be used to organize and track the development process.
- **Environments and Timing:** The identification of the environments, their purpose, and the dates that they will be created.

2 Requirements

2.1 Requirements Overview

The design of the hardware platform, development environment, production environment, and software solutions was created to fulfill the business and technical requirements detailed below.

2.2 Business Requirements List

1. Ability to accommodate 4000 Institutions each containing up to three users.
2. Capability to have most of the institutions accessing the CB System during the same period of time (FISAP submission week) which could cause a spike in user concurrence to a maximum of 200 users (4000 institutions divided by 5 days in week divided by 5 peak work hours per day + 20% contingency).
3. Ability for CB Staff users to do reporting and ad/hoc querying from the Oracle database.
4. Ability for CB Staff administrative users to add institution profiles and correct data stored in the Oracle database.
5. Provide a web interface for institutions and the Department of Education users.
6. Follow SFA standard architecture guidelines.
7. Capability to provide online and store 5 years of institutional data and an additional 10 years of archived institutional with the appropriate allocation of database space.
8. Maximize user performance and minimize the possibility of downtime by building application servers into redundant clusters.
9. Maximize user performance by both the institutions users and the Department of Education users by performing database reports and query's on a server that is separate from web and applications servers.
10. Display FISAP data and award transaction history views for a school within 3 seconds of a user request.
11. Update user submitted changes to this data within 3 seconds.

3 Proposal

3.1 Campus Based Hardware Overview

The makeup of the physical architecture was created to allow for the physical storage of the software, adhere to SFA Standard Architecture Guidelines, minimize response time for the institutional and Department of Education users, and prevent system redundancy. The proposed hardware and software tools would be able to support the business requirements from section 2.2 above.

3.2 System Load Requirements

System Load refers to the amount of traffic on the system due to factors such as the number of users, the number of database accesses performed by application software, the number of interfaces and the amount of data being passed.

Interfaces

- Accommodate 4000 institutional users. The number of concurrent users, under normal circumstances, will be between 20 and 50. However, the possibility of a concurrent user spike to a maximum of 200 is possible due to the timing requirements demanded of the institutions during the FISAP application process. This system will be utilized by the institutions primarily in the months of August through April although they have the potential of using the system throughout the year.
- Each institution will submit a record via the web interface that will contain approximately 4000 bytes of data. The institutions will do this 2-4 times per year.
- Each user has the potential of receiving an error report via the web interface that contains 4-6 thousand bytes of data. Only one error report is produced but the user has the potential of accessing this report via the web multiple times.
- A batch process will run to process FISAP data and determine the awards authorization. This data file will then be sent to ED CAPS on a weekly basis. There is an average of 20 records per week, each containing 180 bytes of data. During the peak processing period there can be as many as 12,000 records in one transmission.

Application and Database Environment

- The amount of developed software is 375 servlets, 100 Java Classes, 60 JSP's, 30 HTML docs, 30 Oracle Stored Procs.
- The total size of the database instance will be 800 megabytes.
- The total size of the Web Server application environment will be 150 megabytes.
- The total size of the Websphere application environment will be 600 megabytes.

3.3 Hardware Requirements List

The physical servers that will be required for the redesigned CB System are located in the list below. They can also be seen in Figure 1 below.

- 2 Sun E3500 Web Servers using the Solaris Operating System
- 2 Sun E3500 Application Servers using the Solaris Operating System
- 1 Hewlett Packard 9000 V Class Database Server
- 1 Compaq DL380 Server

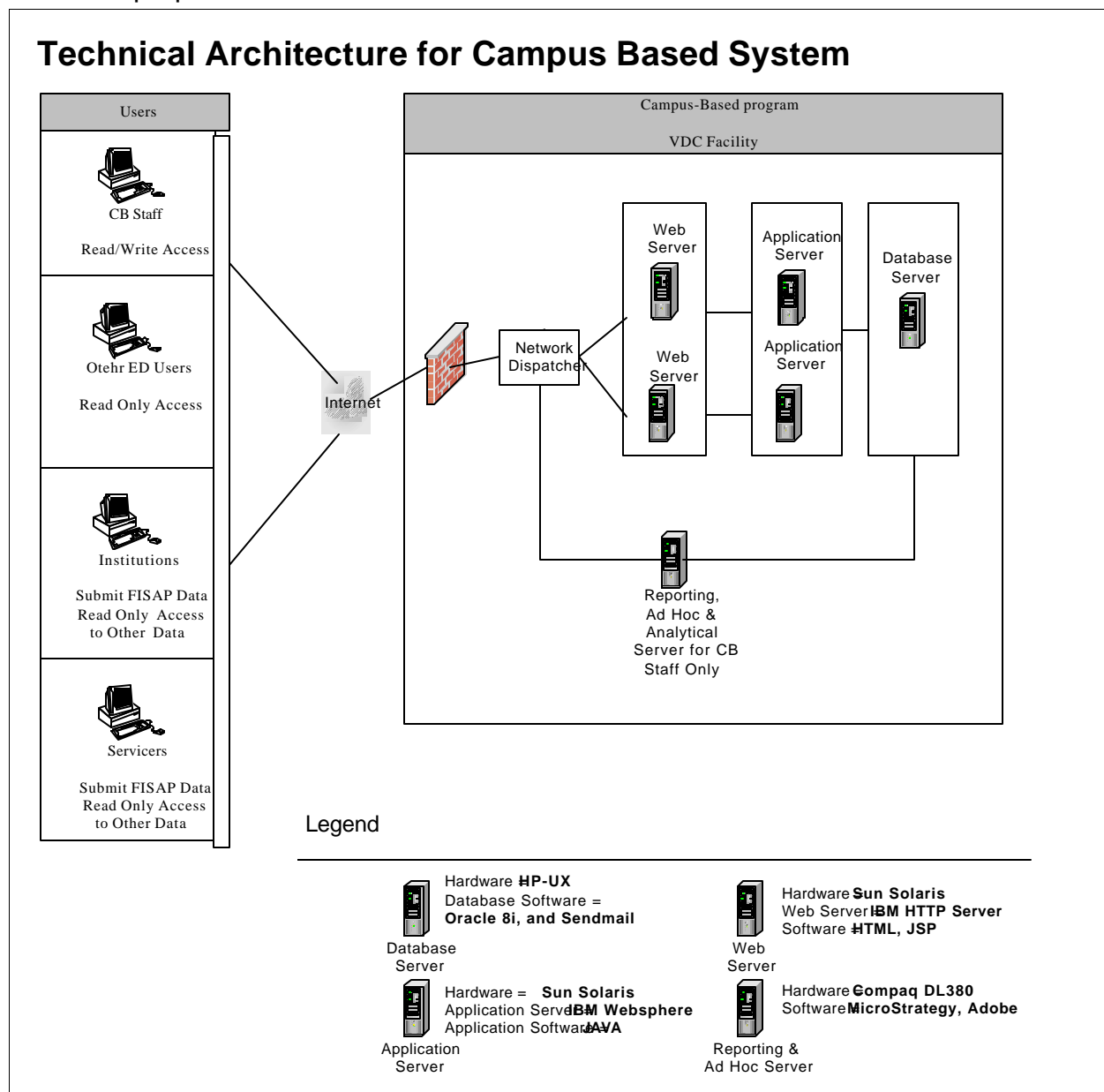


Figure 1. Redesigned Physical CB System Production Environment.

3.4 Software Requirements List

The following software is currently installed in the development environment at the Virtual Data Center (VDC). Initially, this software will be installed in the CB System development, testing, and staging environments. When the CB System development and testing is fully completed these upgrades will be placed into the production environment.

The following software versions will be necessary to support the new CB System. Please note that all of the following software is required by the SFA ITA Standard Architecture Guidelines.

Software	Description
IBM HTTP Server version 1.3.0.12	Web Page Server Software
IBM WebSphere Application Server Version 3.5.2 with support for JSP 1.1	Web Application Server Software. Support for the current release of JSP (Java Server Pages) is contained within this server.
Oracle 8i RDBMS version 8.1.6	Database storage software.
JDK version 1.2.2.03	Current version of the Java Development Kit.
VisualAge for Java	The SFA standard Java development tool.
WebSphere Studio	The SFA standard application development tool.

The current application programs are coded in COBOL and reside on the mainframe. These programs will be converted to JAVA applications programs and will reside on the application servers.

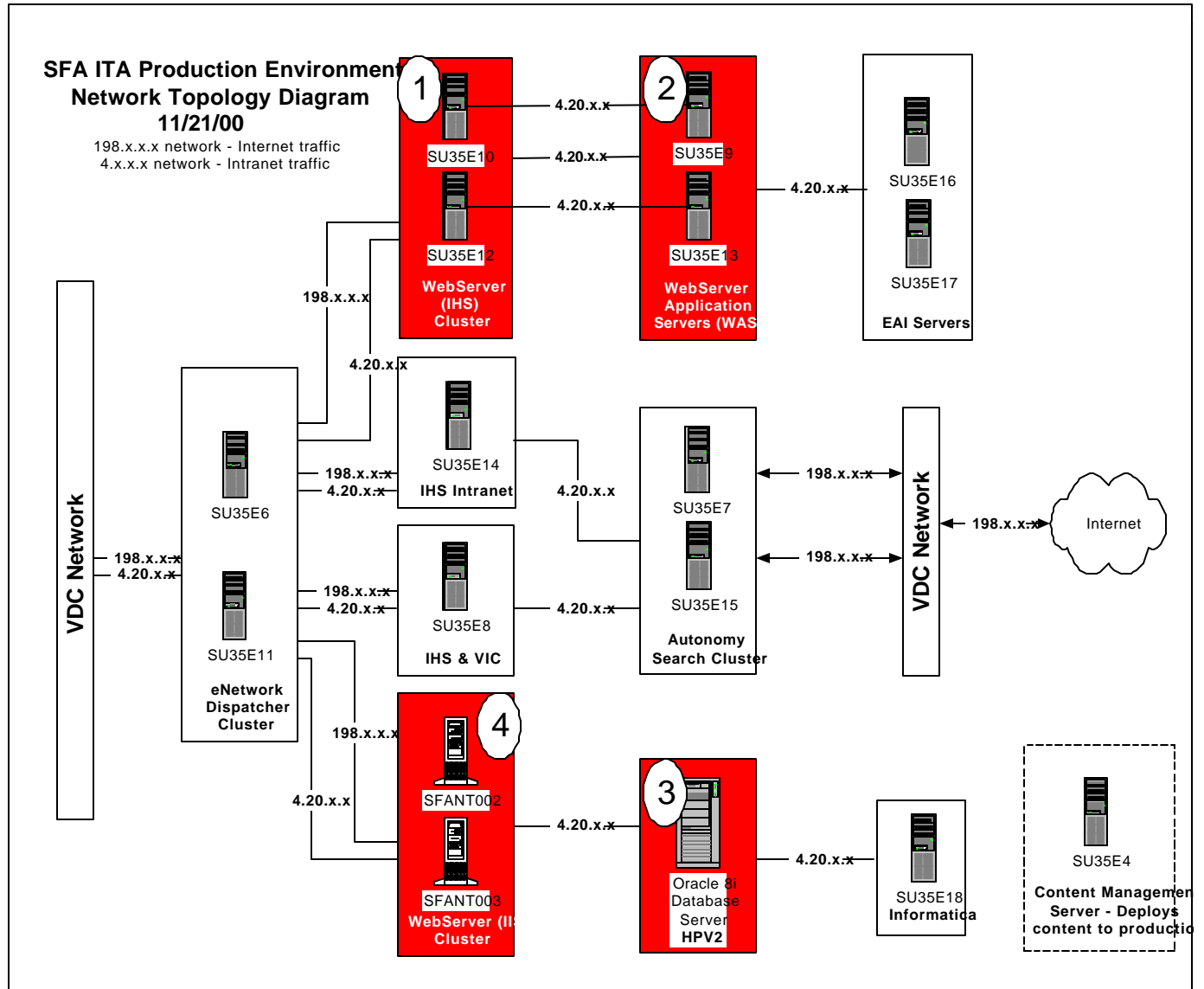


Figure 2. Current VDC Technical Architecture

3.5 Use of Existing VDC Hardware

In an effort to reduce cost and maximize the utilization of existing hardware, some of the existing servers located at the VDC in the SFA ITA (Integrated Technical Architecture) Production Environment have been identified as candidates to host the redesigned CB System. Their identification as candidates is based on their function in the current production environment as it relates to the proposed CB System requirements. The CB System will share this environment with the IFAP system which is currently residing on this platform.

In figure 2, the web servers (labeled 1), application servers (labeled 2), the database server (labeled 3), and a reporting server (labeled 4) directly correspond to CB System production servers in the Redesigned Physical CB System Production Environment diagram in figure 1 above.

3.6 Software Versioning Issues

An upgrade of the current SFA ITA production operating systems and applications servers will be necessary in order to host the new CB System. Currently in the production environment, the VDC maintains Sun E3500 servers running the Solaris 2.6.1 operating system with IBM WebSphere version 3.0.2.1 used as the application software. The current limitation of this combination of operating system and software involves server side HTML includes and JSP includes. When using Java Server Pages (JSP) version .91, which is the default version for the current production WebSphere application server, the HTML includes directive will error. The solution for this problem is to upgrade WebSphere to version 3.5.2 and to apply 10 patches to the Solaris operating system. In addition to solving this problem, upgrading the WebSphere product will also allow full support for JDK 1.2, add new site analysis tools, provide enhancements to the SecureWay Directory Server (LDAP Server) and apply the SFA Standard Architecture Guidelines to the production environment.

4 Configuration Management Tools

In order to facilitate the development effort of the CB System, ClearCase and ClearQuest will be installed for use in the development environment. These products will be installed using the UCM schema. They will be administered by developers working with Beacon Technologies.

ClearCase is a change management tool whose function will be to regulate and monitor the development process by providing a structured process to develop, implement and promote code in the Development, Testing, Staging, and Production environments located at the VDC.

ClearQuest is used for tracking defects in the developed code and for coordinating the fixes to that code with both the developers and the Clear Case product.

5 Environment Timing

Environments must be created at the VDC that will be used for creating the CB system. The creation dates of the development, testing, staging, and production environments at the VDC will be as follows:

Environment	Creation Date
Development	2/1/2001
Testing	4/1/2001
Staging	7/1/2001
Production	8/1/2001

The development, testing, and staging environments have the option of being removed from the VDC or being kept for any future development needs that the CB System may identify.